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ABSTRACT

The concept of anomie is proposed as one sociological variable that may explain the "brain drain" phenomenon (i.e., the movement of highly qualified personnel from their country of origin to another, most often a more developed, technologically advanced country). It is hypothesized that the higher the level of anomie found among professionally trained individuals sharing the same success goals as the world scientific community and having innovative response, the greater the likelihood that they will leave their home country to work abroad. It is suggested that in order to test this thesis, one would need to measure anomie among professionals who have left their country of origin and who also have experienced difficulty in reaching their goals with the means available. Data are presented and studies are cited that pertain to the thesis of anomie and brain drain. A 1968 study of the utilization of highly qualified human resources in two Chilean cities that measured anomie using Srole's scale found that almost half of the professionals who were dissatisfied with their job performance and who lacked sufficient resources had also contemplated going abroad to find a better opportunity. The United States and Canada were the countries that attracted a great number of professional and technical workers from abroad. In addition, professionals who previously studied abroad later tended to leave their home country, and college students tended to perform well during their graduate studies in countries other than their own. The data indicate that (1) the number of students enrolled in higher education has been greater in technologically developed countries, and (2) expenditures for research and development have tended to be higher in the productive/industrial sector and the higher education sector in developed countries. (SW)

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ANOMIE AND THE "BRAIN DRAIN"

A SOCIOLOGICAL EXPLANATION

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ABSTRACT

The world scientific community develops goals and aspirations to be accomplished by its members; however, means to attain them are not distributed equally due to lack of resources in the less-developed nations. Professional individuals who accept the goals/aspirations of the world scientific community, but cannot achieve them due to lack of support in their own environment may become anomic. As an innovative response that retains goals but changes the means of achieving them, then, they may emigrate to countries where they can attain their goals. This paper holds that anomie is a sociological variable that possible can explain the "brain drain" phenomenon in the world scientific community.

ANOMIE AND THE "BRAIN DRAIN":

A SOCIOLOGICAL EXPLANATION

"Brains are like hearts, they go
where they are appreciated...."

Robert McNamara

Many professionals have left their country of origin to work abroad. The literature on brain drain is extensive, yet it is a phenomenon that has not been satisfactorily explained from sociological and theoretical perspectives. One possible explanation of brain drain, particularly for the period of 1960s and early 1970s, utilizes the concept of anomie.¹ The concept of anomie is seen as the breakdown of what an individual believes society expects from him due to a discrepancy between culturally-prescribed goals and socially-accepted means to attain them. The assumption is made that anomie experienced by professionals is one of the factors that motivates them to leave their country of origin. It is important to note that this analysis assumes the existence of a world scientific community.

THE BRAIN DRAIN

The phenomenon known as brain drain refers to the movement of highly qualified human personnel from their country of origin to another, most often a more developed, technologically advanced country. The term was created in the 1960s by the British to describe their scientists'

emigration. It is related also to the U.S. Immigration and Naturalization Law (December 1965) that facilitated the entrance of foreign professionals, scientists, and technicians into the United States.

A great deal has been written about the brain drain phenomenon. UNESCO² has identified more than 3,000 books and articles on the subject. Authors have pointed out the quantitative and economic variables attributed to this type of migration.

This international movement is considered as a net outward migration over a period of time, principally toward the United States. It has also been found that individuals who emigrate from their home country tend to be scientists of international reputation with professional academic³ qualifications.

This type of migration is not a new phenomenon, but it has increased tremendously since World War II. Commentators concerned with this migration usually assume either a nationalistic or cosmopolitan position. The nationalists believe that academic migration is a detriment to the originating country, while cosmopolitans hold that migration occurs as a social response to problems existing in the country of origin and in the country of destination. While some authors claim there is a shortage of professionals in developing nations and proffer ideas designed to stop this international flow, others estimate that educational systems sometimes produce more professional people than the labor market actually can absorb.

The brain drain cannot be understood only in terms of either "push" variables or "pull" variables. The phenomenon is better analysed in a comprehensive manner by using a differential push-pull approach. This approach stresses the idea that the individual's decision to emigrate is the product of the differential comparison he makes between his present situation and the perceived situation of the country of destination.⁴ Hence, highly qualified professionals not only relate to one another in their own country but also to colleagues in other parts of the world. Therefore, the world scientific community is a "reference group" for all, and it is under this situation that the hypothesis of anomie functions.

THE CONCEPT OF ANOMIE AS A FRAME OF REFERENCE

Merton uses the concept of anomie to explain the relationship⁵ between cultural structure, social structure, and individual behavior. He explains that there are two important and analytically separate elements that are part of the social and cultural structure of society. The first element is the culturally-defined goals considered as the legitimate objectives for "all or [for] diversely located members of the society." The goals are more or less integrated, "roughly ordered in some hierarchy of values," and they also represent a "frame of aspirational reference." The second element is defined as containing the acceptable modes for achieving culturally-prescribed goals. Occasionally, however, an individual may find it easier to reach the goals by using any convenient or technically efficient method rather than those accepted by the traditional social and

cultural structures. Society places sometimes more emphasis on a particular type of goal without having given similar emphasis to the culturally-accepted means of obtaining it.⁶ What happens if it is not possible to reach the goals by using culturally-prescribed means or norms? Merton notes that...

continuing satisfaction must derive from sheer participation in a competitive order.... [However], if concern shifts exclusively to the outcome of competition, then those who perennially suffer defeat may, understandably enough, work for the change in the rules of the game.... [Thus], it is, indeed, my central hypothesis that aberrant behavior may be regarded sociologically as a symptom of dissociation between culturally prescribed aspirations and socially structured avenues for realising these aspirations.⁷

Referring to the relationships between the cultural structure, social structure, and the concept of anomie, Merton writes that...

cultural structure may be defined as that organized set of normative values governing behavior which is common to members of a designated society or groups. And social structure is that organized set of social relationships in which members of the society or group are variously implicated. Anomie is, then, conceived as a breakdown in the cultural structure, occurring particularly when there is an acute disjunction between the cultural norms and goals, and the socially structured capacities of members of the group to act in accord with them....⁸

Thus, an individual experiences anomie when he feels he must achieve the culturally-stressed goals, but at the same time, realizes he cannot use the culturally-prescribed means to attain them. Psychologically, the individual may feel uncertain, insecure, and even lack knowledge as to what society expects him to do. Merton holds that anomie...

signifies the state of mind of one who has been pulled up by his moral roots, who has no longer any standards but only disconnected urges, who has no longer any sense of continuity.... Anomie is a state of mind in which the individual's sense of social cohesion -the mainspring of his morale- is broken or fatally weakened.

In MacIver's words, this represents the "breakdown of the individual's sense of attachment to society."¹⁰ Relating anomie to occupational aspirations, Rhodes stipulates that part of the...

anomie theory involves the assumption that in a society which demands that all members compete for success.... the system is structured so that access to means of success is restricted. This disjunction between ends and means is a source of stress which produces anomie at the level of system analysis, and in its individual counterpart 'anomia' in the person who can't win.

Mieir and Bell suggest that...

socially structured limitations in access to the means for the achievement of life goals produces anomie in the individual so affected.¹²

Srole writes that three inclusive forces may be seen as operating on the individual in a contemporary situation. These include:

[First], reference groups beyond his immediate field of action, within which acceptance and ultimate integration are sought.... [Second], generalized qualities of the molar society penetrating his contemporary action field, as these affect his life-goals choices, his selection of means toward these goals, and his success or failure in achieving these goals.... [And, third], the socialization processess of his interpersonal relationships.... as these have conditioned the interpersonal expectations,
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value orientations, and behavioral tendencies....

THE WORLD SCIENTIFIC COMMUNITY

If the anomie hypothesis is to be tested, the existence of a world scientific community not restricted to the physical sciences, but including social sciences, the arts and humanities must be assumed. This community consists of highly qualified professionals who share values, aspirations, academic and vocational norms, and similar scientific behaviors. In the world scientific community, it is asumed that all kind of scientists have structured their own means to achieve community goals.

The reward system for scientific achievement in America is related to the influences that scholars exert upon the conduct of one-another's research. This influence may be exerted through professional publications, formal and informal meetings, and contact made with graduate students in the field. The desire for recognition induces scientists to publish their

results. This encourages them to conform to scientific norms by contributing new discoveries to the world scientific community. It is expected that scientists investigate and publish in order to achieve this recognition. Those who do not tend garner less prestige or may even become isolated. Considering the scientific community as a reference group, Hagstrom points out that "the set of persons with whom most communication is maintained will probably have the greatest influence on the scientist's own perspective."¹⁴ His thesis is that "solidarity of this community and the conformity of its members is secured through intensive socialization and a complementary system of social control."¹⁵

Formal and informal communication through publication are very important. Storer describes the need for keeping a "common universal discourse" as the means by which scientists can communicate and cooperate with one-another.¹⁶ They are also able to assess the validity and significance of their own work as well as the work of the others. von Rossum analyzes the informal communication system when he refers to such concepts as "invisible college", social networks, and social circles that emerge out of close relations among scientists. There exists the tendency toward "achieving minimum discrepancy between attitudes of people who have a high degree of mutual attraction."¹⁷

Gaston refers to the reward system in British science and to the idea of a scientific community when he notes that "prestige of institutions and departments affects the productivity of scientists and the recognition scientists receive from the scientific community." One of the main reasons

why scientists do research is to obtain recognition, since rewards go to scientists who are known by this community. Scientists trained in the most prestigious universities in the United States tend to be more productive. Gaston reports that the statistical "correlation between publication and recognition is .69 which suggests that the number of publication is a more important factor in recognition than professional age." What kinds of contributions must scientists make in order to be recognized and successful in the world scientific community? Gaston suggests that the types of contribution that result in recognition and success include: implementing research and publication, the teaching of future scientists, assisting other scientists in their research, referring papers, acting as a guest lecturer, editing books and articles, serving on journal editorial boards, receiving awards, gaining membership in honorary scientific societies, and being elected to office of scientific societies. Professional success may also imply a status congruency, a good salary, the utilization of knowledge and skills, an opportunity to work with prestigious individuals and attend professional meetings. These are the goals and aspirations that are most strongly emphasized by the cultural structure of the world scientific community. Each individual wants to obtain them and to be successful. Achieving success is one of the most important goals in itself, and all professional group members seem to have been socialized toward this end.

What is the origin of these goals/aspirations? One prevalent belief is that it originates within the scientific community both at home and abroad. Communication today is facilitated by modern technology

and the enormous number of books and journals published every week. People travel, attend conferences, study, and even teach abroad. Television, satellites, radio, and new information systems unify the world -particularly the world of science. Migration of qualified personnel depends upon free flow of information between countries. Goals, aspirations, and scientific knowledge move from one country to another as people migrate. The scientists' reference group, therefore, tends to become the same as those of the professional and scholars who both work and live in a "better" area, particularly, the United States.

ANOMIE IN THE WORLD SCIENTIFIC COMMUNITY: A SOURCE OF BRAIN DRAIN

Success obviously cannot only be measured in terms of accumulated wealth. Scientists naturally want good salaries. However, it has been found that their aspirations go beyond this limited realm. They require, for example, that their research be supported by substantial funds. Others find it important to spend their time looking for jobs that enable them to use their knowledge and training.

Professionals and scientists count upon the financial support they receive from their place of employment to be able to perform their jobs properly and to meet their goals. But where do the means to achieve these goals come from? While the goals are influenced by the world scientific community, the means are conditioned by the country and the institution where the scientist actually works. If the world scientific community places too much stress on the achievement of goals, and does not pay

enough attention to the means of achieving them (or it assumes that means are easily available for almost everyone); then the individual may feel he is not perceived as valuable enough to warrant the resources he needs to achieve the goals. He may become frustrated and subsequently become anomic. In this situation an individual may feel that he does not know what is expected of him, especially if the resources are not made readily available to him.

It is well known that exaggerated bureaucratization, the lack of resources, and the lack of institutional support are sources of frustration and anomie. Another source of discontent is the conflict between the values of the scientists and the apparent needs of industry. It has been reported that in Argentina, for example, engineers are sometimes supervised by people whose level of education, knowledge, and whose skills are lower than their own. This implies that promotion is based upon criteria other than professional or academic ones. Unemployment or under-utilization also may be seen as a source of lack of recognition, frustration, and anomie. Findings reported elsewhere show that a group of Chilean scientists and professionals were, in 1969, either under-utilized or working in positions quite unrelated to their professional qualifications. It is possible for professional individuals who experience anomie to begin to look for more efficient ways to reach their goals, especially by traveling to a country other than their own. Hagstrom insists that "failure to be recognized, to have one's own judgement reinforced by the judgement of others, may lead to a loss of faith in the

values of one's own work," and hence, an anomic situation may begin. In other words, "anomy in science, can be specified as the general absence of opportunity to achieve recognition...."²²

Merton suggests a typology consisting of five modes of individual adaptation to anomie: conformity, ritualism, retreatism, rebellion, and innovation.²³ Conformity to both cultural goals and institutionalized means is the most common form of adaptation to anomie. Ritualism can best be seen or shown as the action of a bureaucrat. Ritualists abide meticulously to rules and regulations. Retreatism is seen as the rejection of both cultural goals and the institutionalized means to achieve them. Merton notes that "people who adopt (or maladopt) in this fashion are, strictly speaking, in the society but not of it."²⁴ Rebellion has to do with the "rejection of prevailing values and [the] substitution of new ones." Innovation is the acceptance of the cultural goals, but the rejection of the institutionalized means. Merton writes that this "response occurs when the individual has assimilated the cultural emphasis upon the goal without equally internalizing the institutional norms governing ways and means for its attainment."

It is through Merton's adaptation called innovation that the relationship of brain drain and anomie can be seen. Achieving the success-goal can be difficult or almost impossible for those individuals with few economic resources. Professionals and scientists who accept the success-goal identified by the world scientific community but feel they

do not have the means to achieve it in their own country, become more oriented toward leaving their motherland. The individual's decision to leave the homeland and then move to a country having better means for goal achievement is an innovative decision. Hagstrom notes that innovation in science "would take the form of commitment to the goal of recognition but attempting to attain it through [other] means."²⁵ Chorafas pointed out that the individuals leaving Europe "are still proudly British, French, German, or Italian, but who have abandoned hope of proper recognition and progress in their country of origin."²⁶

Thus, the concept of anomie seems to be one of the sociological variables that may explain the brain drain phenomenon. The hypothesis can be expressed in this manner: THE HIGHER THE LEVEL OF ANOMIE FOUND AMONG PROFESSIONALLY TRAINED INDIVIDUALS SHARING THE SAME SUCCESS-GOALS AS THE WORLD SCIENTIFIC COMMUNITY AND HAVING INNOVATIVE RESPONSE, THE GREATER THE LIKELIHOOD THAT THEY WILL LEAVE THEIR HOME COUNTRY TO WORK ABROAD.

In order to test this hypothesis, it would first be necessary to discover whether scientists, engineers, technicians and other qualified personnel who are currently working in a country other than their homeland had become anomic. An attempt must be made to measure anomie among those professionals who have left their country of origin and who also have experienced difficulty in reaching their goals with the means available. It would also be necessary to analyse the extent to which this circumstance actually motivated their decision to leave their own country. This study

would be very difficult to undertake, since it would require the study and analysis of the individual problems facing each person involved. Instead, secondary data that is related to this hypothesis can be used to describe²⁷ the theoretical and historical framework.

SOME EVIDENCE TO SUPPORT THE HYPOTHESIS

In 1968 a study was made of the rational utilization of highly qualified human resources in two Chilean cities. An attempt was made, among other things, to find out what extent Chilean professionals had experienced anomie.²⁸ In order to measure anomie among the interviewees, Srole's scale was used. The scale consists of an opinion-poll format²⁹ of the individual's perception of his own personal situation. The findings showed that almost half of those professionals who were dissatisfied with their job performance (in the two Chilean cities studied) and who also lacked sufficient resources had also contemplated going abroad to find a better opportunity.

Second, it is observed that the United States and Canada are those countries that attract a great number of professional, technical and kindred workers from abroad, (Table 1). Those percentages represent a majority of immigrants in the United States categorized by occupation, as well as those admitted into Canada. Chorafas reports that a large proportion of graduate who left Britain and the Commonwealth, and came to the United States are scientists, engineers and technologists. The number increased during 1961 and 1968 by 53.8 percent for scientists and by 121.1

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percent for engineers and technologists.

Third, evidence indicates that professionals who previously have studied abroad have later tended to leave their home country. Table 2 shows that in the United States and Canada, the number of foreign students and professionals increased substantially between 1962 and 1971. This is a comparison of the total number of immigrants having an occupation with those without an occupation. It is interesting to observe that foreign students' enrollments increased substantially both in the United States and Canada during 1950 to 1971. Perhaps the world scientific community's values and goals are particularly internalized during studentship in countries attracting qualified personnel. Table 3 describes an interesting relationship between figures on foreign students' enrollments in American colleges and universities in 1971, and data about professional, technical and kindred workers admitted to the United States in 1974.

Fourth, it is interesting to note that college students tend to perform well during their graduate studies in countries other than their
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 own. This situation may improve a foreign student's chance to apply for immigrant status in the country where he studied or in the United States. An analysis of the changes in the type of visa in the United States provides other interesting insights. Table 4 shows the percent changes in the adjustment of visa-status from non-immigrant to permanent resident in the United States for professional, technical and kindred workers. As shown in column (C) in a substantial number of countries, a majority of those who adjusted their visa-status from non-immigrant to permanent

resident previously had been students in the United States.

Fifth, it is apparent that the world scientific community tends to focus interest on developed countries where prestigious scholars congregate and where enrollments at the college level are higher. Table 5 shows enrollment percentages by group of countries, and indicates that the number of students enrolled in institutions of higher education is ³² greater in technologically developed countries.

Sixth, expenditures for research and development tend to be higher in the productive/industrial sector and the higher-education sector in developed countries, while in developing countries these expenditures tend to be greater in the sector of general services, (Table 6). A similar pattern occurs with respect to the number of scientists, engineers and technicians engaging in research and development. According to UNESCO, "98 percent of expenditures on research and development is made in ³³ developed countries having a free market economy." Chorafas found that the United States expenditures in research and development were greater in the industrial sector during 1959 and 1968, and the area in which expenditures in research and development increased the most was the ^{34,} higher education sector where pure research had stronger interest. It is important to note that the world scientific community emphasized that rewards and resources have been concentrated in the industrial/productive sector and the higher education sector. At the same time, institutions of higher education have come to be the leader in the world scientific community.

CONCLUSION

Scientists in both physical and social sciences as well as engineers, technicians, and professional in the arts and the humanities understand that important and influential individuals tend to work where research and development are more strongly supported. This situation becomes significant when acknowledging that the values and goals of the international scientific community are known world-wide, especially by students, scholars, and intellectuals including those working in less-developed countries where means and resources are more scarce. It is in this perspective that the concept of anomie and the brain drain phenomenon seem to be related.

REFERENCES AND NOTES

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2. UNESCO. Scientists Abroad, (The UNESCO Press, Paris, 1971), pp. 50-74.
3. S. Hatch. "Why Scientists Leave Britain", New Scientist, 34, 540 (1967), pp. 98-100.

4. There are many structural and personal conditions. Support for research and development, for example, in the United States, especially during the space race, has been mentioned as a strong factor in attracting alien professional individuals. On the other hand, low salaries, inferior standards of living, political pressure, and opportunity for advanced education elsewhere are some of the personal factors mentioned for leaving the motherland.
5. R.K. Merton. Social Theory and Social Structure, (The Free Press, New York, 1964), pp. 131-194. Merton's concept of anomie will be briefly reviewed, especially regarding an individual's adaptation when discrepancies between cultural goals and institutionalized means arise.
6. Merton refers principally to monetary success. He nevertheless notes that human beings have other goals in life.
7. Ibid, p. 134. The terms "aberrant" or "deviant" behavior must be understood as functional concepts. They are neither pejorative nor meant to be derogatory. Merton (p. 184) points out that "the concept of social deviation and social dysfunction do not harbor concealed ethical premises."
8. Ibid, p. 162.
9. Ibid, p. 162.
10. R.M. MacIver. The Rampart We Guard, (The Macmillan Co., New York, 1950), pp. 84-92.
11. L. Rhodes. "Anomia, Aspiration, and Status." Social Forces, 42, 4, (1964), pp. 434-435.

12. D.L. Mieir and W. Bell. "Anomia and Differential Access to the Achievement of Life Goals." American Sociological Review, 24, 2 (1959), p. 190.
13. L. Srole. "Social Integration and Certain Corollaries: An Exploratory Study." American Sociological Review, 21, 6, (1956), p. 711.
14. W.O. Hagstrom. The Scientific Community, (Basic Books, Inc., New York, 1965), p. 43.
15. Ibid, p. 292.
16. N.W. Storer. "Basic Versus Applied Research: The Conflict Between Means and Ends in Science." Indian Sociological Bulletin, 2,1 (1964), p. 34.
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21. O. Karadima. "Professional Human Resources in the Social Development of Chile." Co-Existence, 13, 1 (1974), pp. 81-110.
22. W. Hagstrom. "Anomy in Scientific Community." Social Problems, 12, 2 (1964), pp.192-193.

23. R.K. Merton. Social Theory and Social Structure. Op. cit. pp. 140-157
24. In this case, retreatism could mean dropping out of science or the profession, which is also common in Latin America.
25. W.O. Hagstrom. The Scientific Community. Op. cit. pp. 234-235.
26. D.N. Chorafas. The Knowledge Revolution, (George Allen and Unwin Ltd., London, 1968), p. 14.
27. Scholars, researchers, and doctoral students are called upon to engage in further related investigation to analyze and test the hypothesis presented in this article.
28. O. Karadima. "Professional Human Resources in the...." Op. cit. pp. 81-110.
29. L. Srole. "Social Integration and Certain Corollaries: An Exploratory Study". Op. cit. pp. 709-716.
30. D.N. Chorafas. The Knowledge Revolution. Op. cit. p. 55
31. Bie reports, for example, that this is true among some Norwegian scholars who have studied abroad. See: K.N. Bie. "Norwegian Students at British Universities: A Case Study of the Academic Performance of Foreign Students." Scandinavian Journal of Educational Research, 20,1 (1976), pp. 1-24.
32. Some authors, however, note a new type of international migration of over-qualified class workers. Freeman points out that due to over-education in the United States, a certain kind of "reverse brain drain" from the United States to outside the country might become characteristic in the late 1980s and 1990s. See: R.B. Freeman.

The Over-Educated American, (Academic Press, New York, 1976), p. 198.

When this situation does occur, the hypothesis presented in this essay will still be applicable since the professional scientific community is a world-wide phenomenon.

33. UNESCO. Scientists Abroad. Op. cit. p. 26.
34. D.N. Chorafas. The Knowledge Revolution. Op. cit. p. 20.
35. U.S. Department of Justice. Annual Report 1974, (Immigration and Naturalization Service, Washington D.C., 1975), Tables 8 and 10.A.
36. Statistics Canada. Canadian Statistical Review, (The Ministry of Industry, Trade and Commerce, Ottawa, 1975), Table 4.
37. UNESCO. Statistical Yearbook, (The UNESCO Press, Paris, 1975), Tables 1.2, 2.2, 4.1, 4.2, 4.3, 4.7, 4.8, 5.1, 6.3, and 7.3.
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TABLE1: PROFESSIONAL, TECHNICAL AND KINDRED WORKERS (PERCENT) ADMITTED INTO THE UNITED STATES AND CANADA OUT OF THE TOTAL NUMBER OF IMMIGRANTS WITH OCCUPATION, 1968 TO 1974.*

YEARS	UNITED STATES		CANADA	
	PROFESSIONAL, TECHNICAL AND KINDRED WORKERS	TOTAL NUMBER ADMITTED, HAVING AN OCCUPATION	PROFESSIONAL, TECHNICAL AND KINDRED WORKERS	TOTAL NUMBER ADMITTED, HAVING AN OCCUPATION
1968	23.3	209,031	30.7	95,354
1969	26.0	155,753	32.3	83,215
1970	29.4	157,189	29.8	75,507
1971	31.9	153,122	27.6	59,267
1972	31.1	157,241	26.8	56,946
1973	26.4	156,477	22.4	87,379
1974	23.5	151,268	21.8	99,447

* Percentages have been calculated with regard to the total number of persons having an occupation. The group called "housewife, children and others with no occupation reported" has been substracted with the assumption that they are dependent people.

SOURCE: Data from references (35) and (36).

TABLE 2: PERCENTAGES OF GROWTH IN THE NUMBER OF IMMIGRANTS ADMITTED INTO THE UNITED STATES AND CANADA, 1950 TO 1971.

IMMIGRANTS ADMITTED	UNITED STATES	CANADA
Total Number of Immigrants (1962-1971)	30.6	63.4
Immigrants with Occupation (1962-1971)	13.6	61.3
Professional and Technical Workers (1962-1971)	106.0	98.4
Foreign Students (1962-1971)	116.6	263.4
Foreign Students (1950-1962)	117.0	167.2
Foreign Students (1950-1971)	370.0	871.1

SOURCE: Data from references (35), (36), and (37).

TABLE 3: PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS ADMITTED INTO THE UNITED STATES IN 1974, AND FOREIGN STUDENT ENROLLMENT IN HIGHER EDUCATION IN 1971 PER 10,000 PEOPLE, BY COUNTRY OF ORIGIN.

COUNTRY OF ORIGIN	PROFESSIONAL, TECHNICAL AND KINDRED WORKERS	FOREIGN STUDENT ENROLLMENT
Austria	22.0	0.8
Czechoslovakia	39.0	21.8
Denmark	22.0	20.1
France	64.0	157.0
Germany (Fed. R.)	158.0	174.7
Greece	121.0	156.5
Hungary	59.0	9.8
Ireland	97.0	32.7
Italy	130.0	89.0
Netherland	50.0	64.8
Poland	142.0	39.5
Romania	116.0	13.5
Spain	75.0	49.2
Sweeden	28.0	41.8
Switzerland	26.0	37.9
USSR	65.0	6.8
United Kingdom	426.0	293.2
Yugoeslavia	72.0	29.4

(To be Continued on Next Page)

TABLE 3 (Continuation)

COUNTRY OF ORIGIN	PROFESSIONAL, TECHNICAL AND KINDRED WORKERS	FOREIGN STUDENT ENROLLMENT
Hong-Kong	76.0	789.3
India	1356.0	962.5
Indonesia	24.0	53.8
Iran	163.0	574.5
Iraq	50.0	30.0
Israel	102.0	169.7
Japan	124.0	364.5
Jordan	62.0	82.5
Korea	863.0	296.1
Lebanon	65.0	106.4
Phillipines	1851.0	230.4
Syria	52.0	36.0
Taiwan	712.0	970.3
Thailand	177.0	471.3
Turkey	52.0	115.9
Vietnam	21.0	113.6
Egypt	132.0	87.7
Australia	86.0	75.6
Canada	255.0	882.1
Mexico	144.0	212.2

(To be Continued on Next Page)

TABLE 3 (Continuation)

COUNTRY OF ORIGIN	PROFESSIONAL, TECHNICAL AND KINDRED WORKERS	FOREIGN STUDENT ENROLLMENT
Barbados	24.0	13.9
Cuba	194.0	645.9
Dominican Rep.	88.0	63.6
Haiti	47.0	42.8
Jamaica	160.0	132.8
Trinidad-Tobago	82.0	84.9
Costa Rica	13.0	33.2
El Salvador	22.0	37.3
Guatemala	20.0	31.7
Honduras	25.0	33.2
Nicaragua	19.0	41.7
Panama	26.0	70.7
Argentina	45.0	64.5
Brazil	35.0	127.4
Chile	39.0	81.0
Colombia	78.0	169.3
Ecuador	36.0	51.8
Guayana	55.0	75.7
Peru	56.0	123.8
Uruguay	13.0	13.4
Venezuela	10.0	151.5

SOURCE: Data from references (35), and (37).

TABLE 4: UNITED STATES IMMIGRATION AND ADJUSTMENT OF VISA-STATUS FROM NON-IMMIGRANT TO PERMANENT RESIDENT,
BY COUNTRY OF LAST RESIDENCE IN 1968.*

COUNTRY OF LAST RESIDENCE	(A) PROFESSIONAL, TECHNICAL AND KINDRED WORKERS ADMITTED	(B) PROFESSIONAL, TECHNICAL AND KINDRED WORKERS WHO ADJUSTED VISA-STATUS FROM NON-IMMIGRANT TO PERMANENT RESIDENT		(C) FOREIGN STUDENTS WHO ADJUSTED VISA-STATUS FROM NON-IMMIGRANT TO PERMANENT RESIDENT		
	Number	Number	% to col (A)	Number	% to col (A)	% to col (B)
Austria	367	20	5.4	5	1.4	25.0
Czechoslovakia	76	5	6.6	1	1.3	20.0
Denmark	319	14	4.4	1	0.3	7.1
France	683	76	11.1	23	3.4	30.3
Germany (F. Rep)	1971	165	8.4	80	4.1	48.5
Greece	463	269	58.1	120	25.9	44.6
Hungary	67	9	13.4	5	7.5	55.6
Ireland	687	10	1.5	5	0.7	50.0
Italy	798	105	13.2	39	4.9	37.1
Netherlands	384	26	6.8	12	3.1	46.2

TABLE 4 (Continuation)

COUNTRY OF LAST RESIDENCE	(A) Number	(B) Number	(C) % to col (A)	Number	% to col (A)	% to col (B)
Poland	374	33	8.8	7	1.9	21.2
Romania	30	3	10.0	2	6.7	66.7
Spain	1160	75	6.5	31	2.7	41.3
Sweeden	467	23	4.9	7	1.5	30.4
Switzerland	548	53	9.7	18	3.3	34.0
Turkey	174	72	41.4	35	20.1	48.6
United Kingdom	5405	240	4.4	83	1.5	34.6
Yugoeslavia	205	29	14.1	8	3.9	27.6
Hong-Kong	826	521	63.1	345	41.8	66.2
India	1925	1495	77.7	1263	65.6	84.5
Indonesia	83	35	42.2	22	26.5	62.9
Iran	435	431	99.1	212	48.7	49.2
Iraq	87	81	93.1	48	55.2	59.3
Israel	738	266	36.0	165	22.4	62.0

TABLE 4 (Continuation)

COUNTRY OF LAST RESIDENCE	(A) Number	(B) Number	(C) % to col (A)	(C) Number	(C) % to col (A)	(C) % to col (B)
Japan	467	317	76.9	131	28.1	41.3
Jordan	106	83	78.3	38	35.8	45.8
Korea	680	661	97.2	378	55.6	57.2
Lebanon	303	86	28.4	48	15.8	55.9
Philippines	4844	665	13.7	288	5.9	43.3
Syria	61	57	93.4	39	63.9	68.4
Taiwan	1718	1685	98.1	1358	79.0	80.6
Thailand	213	104	48.8	50	23.5	48.1
Vietnam	66	40	60.6	17	25.8	42.5
Egypt	398	108	27.1	65	16.3	60.2
Australia	381	82	21.5	42	11.0	51.2
Canada	7117	258	3.6	136	1.9	52.7
Cuba	4603	7	0.2	2	0.1	28.6

TABLE 4 (Continuation)

COUNTRY OF LAST RESIDENCE	(A) Number	(B) Number % to col (A)	(C) Number % to col (A) % to col (B)
Dominican Rep.	274	7 2.6	3 1.1 42.9
Haiti	510	1 0.2	1 0.2 100.0
Mexico	824	12 1.5	5 0.6 41.7
Panama	109	2 1.8	2 1.8 100.0
Trinidad-Tobago	521	1 0.2	1 0.2 100.0
Argentina	633	10 1.6	2 0.3 20.0
Brazil	324	36 11.1	10 3.1 27.8
Chile	176	2 1.1	1 0.6 50.0
Colombia	764	6 0.8	1 0.1 16.7
Guayana	192	4 2.1	2 1.0 50.0
Peru	168	6 3.6	2 1.2 33.3
Uruguay	52	5 9.6	1 1.9 20.0
Venezuela	153	22 14.4	7 4.6 31.8

TABLE 4 (Continuation)

COUNTRY OF LAST RESIDENCE	(A) Number	(B) Number	(C) % to col (A)	Number	% to col (A)	% to col (B)
Europe	14878	1328	8.9	527	3.5	39.7
Asia	13036	6959	53.4	4558	35.0	65.5
Africa	1009	337	33.4	194	19.2	57.6
North America	16425	303	1.8	155	0.9	51.2
South America	2887	92	3.2	26	0.9	28.3
Oceania	518	148	28.6	63	12.2	42.6
All Countries	48753	9167	18.8	5528	11.3	60.3

* More recent figures about adjustment in visa-status not currently available.

SOURCE: Data from reference (38).

TABLE 5: DISTRIBUTION OF STUDENT ENROLLMENT (PERCENT) BY LEVEL OF EDUCATION IN MAJOR AREAS IN THE WORLD IN 1971.

MAJOR AREAS IN THE WORLD	LEVEL OF EDUCATION		
	First Level	Second Level	Third Level
United States (1973)	51.6	34.0	14.4
Developed Countries*	60.1	30.6	9.3
United States	63.6	27.1	9.3
Soviet Union	74.5	17.5	8.0
Oceania	63.2	30.8	6.0
Europe	60.0	34.1	5.9
The World [†]	70.5	23.8	5.7
Asia [†]	76.1	20.5	3.4
Latin America	78.0	19.2	2.8
Developing Countries	79.9	17.5	2.6
Africa	85.2	13.5	1.3
Africa ^{**}	89.0	10.3	0.7

*UNESCO considered developed countries to include all of Europe, the Soviet Union, the United States, Canada, Japan, Israel, Australia, New Zealand, and South Africa.

[†]Not included: People's Republic of China, democratic Republic of Korea, and Democratic Republic of Vietnam

^{**}Not included: the Arab countries.

SOURCE: Data from reference (37).

TABLE 6: RESEARCH AND DEVELOPMENT EXPENDITURES (PERCENT) AND PROPORTION OF SCIENTISTS, ENGINEERS AND TECHNICIANS ENGAGED IN R & D, BY COUNTRY AND SECTOR IN 1973.

COUNTRY	PERCENTAGES OF EXPENDITURE ON RESEARCH AND DEVELOPMENT BY SECTOR			PROPORTION OF SCIENTISTS, ENGINEERS AND TECHNICIANS ENGAGED IN R & D		
	Industrial	Higher	General	Industrial	Higer	General
	Economic	Education	Services	Economic	Education	Services
	Sector	Seccor	Sector	Sector	Sector	Sector
Austria	58.3	29.8	11.9	59.2	25.7	15.1
Czechoslovakia	84.7	2.2	13.1	81.6	3.3	15.1
Denmark	47.1	23.9	29.0	48.0	23.4	28.6
France	63.6	14.1	22.3	58.3	18.7	23.0
Germany (Fed. R.)	68.3	19.2	12.5	67.1	19.2	13.7
Greece	29.8	11.5	58.7	23.2	17.7	59.1
Hungary	74.1	9.1	16.8	69.2	10.1	20.7
Ireland	34.7	14.0	51.3	27.2	21.0	51.8
Italy	57.6	23.5	18.9	52.5	30.3	17.2
Netherlands	58.0	20.7	21.3	57.2	20.5	22.3
Poland	80.6	11.8	7.6	84.7	7.6	7.7

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TABLE 6 (Continuation)

Romania	71.8	9.6	18.6	65.5	12.2	22.3
Spain	43.0	3.4	53.6	34.4	9.6	56.0
Sweeden	65.3	22.2	12.5	61.9	25.9	12.2
Switzerland	79.5	14.2	6.3	46.2	39.0	14.8
United Kingdom	68.2	8.1	23.7	79.4	--	20.6
Yugoeslavia	73.4	5.7	20.9	67.0	12.2	20.8
India	--	--	--	5.3	12.5	82.2
Iran	57.5	13.5	29.0	32.5	50.0	17.5
Israel	16.0	65.6	18.4	15.5	58.6	25.9
Japan	61.4	28.5	10.1	54.5	33.7	11.8
Korea	45.2	5.6	49.2	30.0	22.0	48.0
Lebanon	--	57.1	42.9	--	54.6	45.4
Thailand	--	1.6	98.4	--	--	--
Turkey	2.3	19.4	78.3	--	--	--
Australia	28.1	19.8	52.1	28.5	22.1	49.4

(To be Continued on Next Page)

TABLE 6 (Continuation)

Canada	38.9	24.7	36.4	35.3	29.6	35.1
United States	67.0	13.9	19.1	63.7	20.8	15.5
Mexico	5.6	31.7	62.7	13.6	64.1	22.3
Cuba	88.1	11.9	--	82.7	17.3	--
Argentina	49.8	37.1	13.1	37.1	39.2	23.7
Chile	--	--	--	3.4	77.4	19.2
Peru	--	53.5	46.5	--	41.2	58.8
Uruguay	73.2	26.8	--	70.5	29.5	--
Venezuela	0.8	53.8	45.4	0.6	60.4	39.0
Bolivia	35.1	--	64.9	--	--	--

SOURCE: Data from reference (37).